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Nr. 1. P. Jespersen: ON THE OCCURRENCE OF THE POSTLARVAL STAGES OF THE HERRING AND THE "LODDE" (CLUPEA HARENGUS L., AND MALLOTUS VILLOSUS O. F. M.) AT ICELAND AND THE FÆROES.

KØBENHAVN
I KOMMISSION HOS C. A. REITZEL
BIANCO LUNOS BOGTRYKKERI
1920

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MEDDELELSER FRA KOMMISSIONEN FOR HAVUNDERSØGELSER
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ON THE OCCURRENCE OF THE POSTLARVAL STAGES OF THE HERRING AND THE "LODDE" (*CLUPEA HARENGUS* L. AND *MALLOTUS VILLOSUS* O. F. M.) AT ICELAND AND THE FÆROES

BY

P. JESPERSEN

KØBENHAVN
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Through the Danish Fishery Investigations with the marine research steamer "Thor" at Iceland and the Færoes during the years 1903—1908, and with the motor schooner "Margrethe" at the Færoes in 1913 considerable quantities of postlarval stages of herring (*Clupea harengus* L.) and "lodde" (*Mallotus villosus*, O. Fr. Müller) have been collected. This material has been given to me to deal with by the Leader of the Fishery Investigations at the Færoes and Iceland, Dr. Johs. Schmidt.

As to the investigations carried on with "Thor" in those first years, 1903 and 1904, Dr. Schmidt in his book "Fiskeriundersøgelser ved Island og Færøerne i Sommeren 1903" ("Skrifter fra Kommissionen for Havundersøgelser" No. 1, 1904) says on pp. 52—53: "In the same way we have by means of the young-fish trawl gained some insight into the biology of the herring in Iceland waters, where the latter fish, as is well known, is the object of an extremely important fishery. As to the spawning grounds of the herring at Iceland, nothing whatever was known until then, whereas after having proved that the small pelagic herring fry are practically only found in the warm water along the south and west coasts and not along the cold east and north coasts, where the most important fishery takes place during the summer season, we may now venture to say, that the same holds good of the herring as of the cod, which chiefly only spawn in the warm water, but after the spawning in large quantities head for the colder waters of East and North Iceland. In a similar manner light has been thrown on the biology of the "lodde", and we now know that these fish spawn off all the Iceland coasts, whereas formerly nothing whatever was known as to the spawning grounds of the latter off Iceland, in that no eggs or young specimens had been found."

In the following treatment of the subject regard has been paid to all the collections and investigations made by the "Kommission for Havundersøgelser" at Iceland and the Færoes.

Whilst the herring of Iceland, as is well known, plays a very large economic part to the Icelanders as well as to other nations, in particular the Norwegians, the "lodde" has practically no direct, economical importance. The comparatively exhaustive treatment, to which it has nevertheless been subjected, is explained by the great importance of the "lodde" as food for cod and other fish. In the present work it is treated together with the herring, because of their many biological points of resemblance, and a comparison between the two species, the herring representing the warm water species, whereas the "lodde" rather belongs to the indifferent species, consequently offers certain points of interest.

Herring as well as "lodde" have, as is well known, demersal eggs, and the quite young specimens of both of these species are consequently always found over shallow water. As will subsequently appear, the herring only spawn off a limited area of the Iceland coasts, but as the postlarvæ of the "lodde" at a certain season may be found all round Iceland, it frequently happens that postlarval stages of both of these species are found in the same locality. Whereas it is particularly easy to distinguish the two species, when the total length of the specimens exceeds 10 mm. it is rather more difficult, as far as the smallest

stages are concerned. Excellent descriptions and plates of the postlarval stages of the herring are to be found i. a. in EHRENBAUM: Eier und Larven von Fischen des nordischen Planktons, 1909, and of the "lodde" in JOHS. SCHMIDT: On the larval and post-larval development of the Argentines (*Argentina silus*, Ascan. and *Argentina sphyræna*, L.) with some notes on *Mallotus villosus*, O. Fr. Müller. (Medd. fra Komm. for Havundersøgelser. Fiskeri. vol. II. No. 4. 1906). It requires a good deal of practice to distinguish the smallest stages of the herring and the "lodde" (below 10 mm), but a character applicable in most cases is the pigmentation. Besides the fainter ventral pigment the youngest stages of herrings are distinguished by the occurrence of two to four small pigment spots on the tip of the tail, whereas these do not occur on the "lodde". This character is extremely constant. Of the herring family only *Clupea harengus* is proved to have been found off Iceland, and confusion with other clupeoid species in these regions is consequently out of the question.

The complete material comprises in all about 5170 herring young and about 21.650 "lodde" young. Of the herring young far the greater number have been caught off Iceland, and this also holds good of the "lodde" young. At the Færoes, where the "lodde" is of very rare occurrence, only a single young specimen has been caught.

In the tables will be found a general survey of the material collected, as well as of the approximate sizes of the individual specimens. All measurements refer to total length, reckoned from the front part of the head to the base of the caudal fin. In the case of very large hauls the number of specimens measured as a rule have not exceeded one hundred

I am very much obliged to the Leader of the Fishery Investigations, Dr. JOHS. SCHMIDT, for valuable information and assistance throughout the present work.

Herring (Clupea harengus L.).

As is well known herring is found in great quantities off Iceland as well as off the Færoes. In particular round Iceland it is economically very important, and a very large herring fishery is carried on in those waters. During later years particularly the Icelanders have carried on this fishery on a larger scale, but by far the greater quantity of herrings have hitherto been caught off Iceland by foreign nations, and first and foremost by the Norwegians.

It turns out, as already stated by SÆMUNDSSON (1909), that the herring off Iceland have two distinct spawning seasons, in the spring and late in the summer. There is nothing to show that spawning also takes place in the winter. As to the conditions at the Færoes very little is known, and the material at hand is too scanty to furnish reliable information as to spawning seasons and spawning grounds.

I. Iceland.

The material of herring fry at hand from Iceland was collected in the years 1903, 1904, 1905 and 1908. The material from the years 1903, 1905 and 1908 however only comprises a comparatively small number of specimens, whereas the material from 1904 numbers several thousands of postlarval herring. The scanty material from the other years is principally due to the fact that during these years fishing has chiefly taken place in localities, where no herring fry are to be found. The investigations of these years, in the course of which the externally very similar "lodde" postlarvæ have often been caught, are however of great value, in that they contribute very much to our knowledge of where the herring do not spawn.

The following statement comprises first a general survey of finds of herring postlarvæ during the various months of the year, when investigations have been carried on, and after that some recapitulating views as to the spawning conditions of the herring and the occurrence of the herring young off Iceland.

April. In the month of April investigations have only been carried on at Iceland in 1904 and then merely during the latter half of the month. On a cruise round Iceland in 1904 the smallest postlarvæ of the herring (i. e. individuals of less than 10 mm. in length) were only found off the south coast, where they occurred in large quantities. In Faxe Bugt there were only few specimens which were all relatively larger than those found on the south coast (Fig. 1). Along the south coast of Iceland more than 1450 specimens were taken in a single haul, whereas the greatest number of individuals taken in a single haul at Faxe Bugt was 5. This seems to suggest that during the spring the herrings do not to any noteworthy extent spawn in Faxe Bugt, but very largely along the south coast of Iceland, where the water has a temperature exceeding or about + 5° C. Along the west coast of Iceland north of Faxe Bugt no herring young have been taken in April, and on the north coast as well as on the east coast of Iceland only very few specimens. In all 13 specimens were caught at the North and East Iceland stations, but these specimens are all without exception distinguished from the April herring young taken along the south coast of Iceland in that they are twice the size of the latter. The average length is about 10—12 mm. and 26—28 mm. respectively. It is further characteristic of this large herring fry caught in April along the north-east and east coasts of Iceland that they only occur in the cold waters as will appear from the appended chart (Fig. 2). The explanation of the occurrence of these herring postlarvæ, so different in size from the fry of the southern localities at the same time of the year, must presumably be sought in the special hydrographical conditions. As the herring upon the whole is proved to be a fish which exclusively spawns in the warmer waters off Iceland (temp. > 5°) it is difficult to imagine that they have been hatched in these localities during the winter, where the temperature at the surface of the water is only + 0.1°— + 0.5° C. A more likely explanation is that the herring young, found in April at North-eastern and East Iceland, date from the autumn spawning. If so, they have presumably been carried with the current north of Iceland from West Iceland, and on account of the low

Fig. 1. The distribution of the postlarval stages of the herring at Iceland in April.
The figures denote size of smallest and largest specimens in mm.

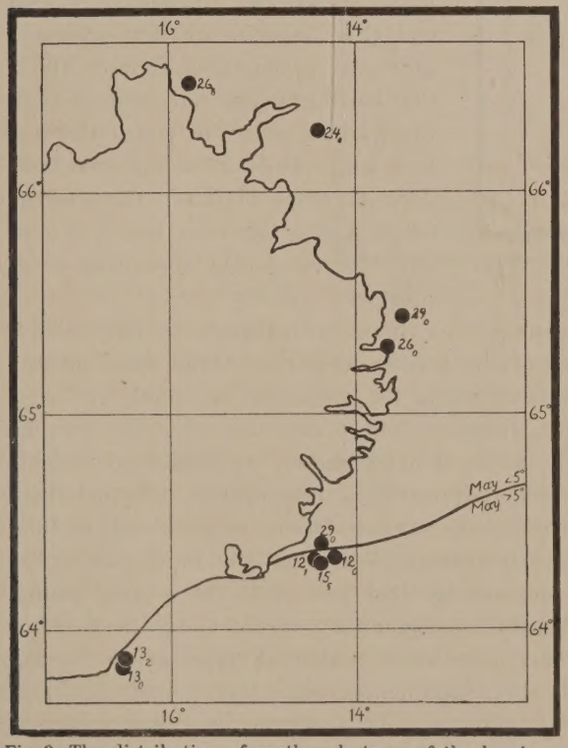

Fig. 2. The distribution of postlarval stages of the herring at East Iceland in April.
The figures denote average size of specimens in mm.

temperature throughout the winter at North Iceland and East Iceland their growth has been very much hampered. What might further indicate a transport from the West is the fact that the distribution of the number of individuals at the stations is from west to east: 8, 1, 2, 1, 1. The correctness of this explanation cannot be proved by means of the material at hand, but there is every probability that the unusually low winter temperatures at North and East Iceland may cause an extremely slow growth.

The localities of these relatively large herring young in April are, it is true, very striking, but it must be remembered that their number is so small as to be of no importance from a quantitative point of view, against the large numbers of quite young stages of pelagic herring postlarvæ which in the month of April appear off South Iceland, and it is at any rate a foregone conclusion that by far the paramount number of the Iceland herrings during the spring season spawn along the south coast.

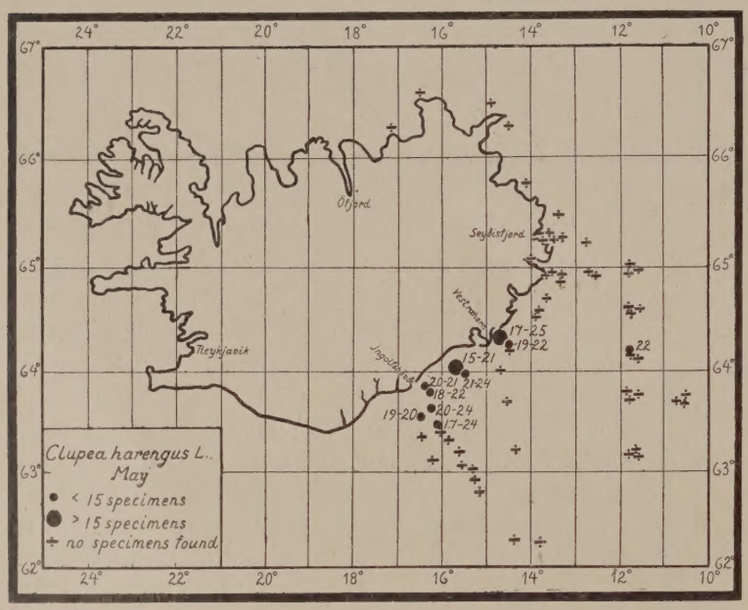

Fig. 3. The distribution of the postlarval stages of the herring at Iceland in May. The figures denote size of smallest and largest specimens in mm.

May. From the month of May collections are only at hand from the eastern part of Iceland, viz. from South-east Iceland, East Iceland and North-east Iceland. Postlarval stages of the herring have only been found in the waters off South-east Iceland, that is from Eystrahorn to Ingolfshøfdi, and at none of the stations specimens of less than 10 mm. have been caught, so that the spawning must already be considered at an end (Fig. 3). The smallest specimen measured a length of 15 mm. All of the herring young are collected in the warmer water, in which the surface temperature at all positive stations is more than 6°. The average length varies between 18 and 22 mm. and the number of specimens is at most 20.

June. During the month of June when investigations have been carried on all round Iceland, except on the east and north-east coasts, postlarval stages of the herring have been found from Ingolfshøfdi at South Iceland to Ønundarfjord at North-west Iceland, along the whole of the south and west coasts (Fig. 4). Everywhere they occur in small quantities (largest number per haul 10). The average length varies between 21 and 25 mm. A comparison with the April hauls shows, with particular clearness, that the postlarvæ of the herring are now far more widely spread in a north-westerly direction along the west coast of Iceland. When examining the average sizes at the various stations in the month of June we find an increase in a northerly direction on the west coast. Average: Faxe Bugt 21.0 mm., off Patriksfjord 24.5 mm. and Ønundarfjord 24.7 mm. The fact is undoubtedly that the shoals of herring young, which in the spring are hatched off the south coast of Iceland, now gradually spread along the coast in a westerly and northerly direction. In this month as in May quite small postlarval stages of the herring i. e. specimens below 10 mm. have not been found, the smallest specimen having a total length of 20 mm.

July. During the early half of the month of July only herring postlarvæ of a length varying between 21 and 39 mm. have been found, but from about 15.—17. July quite small herring postlarvæ, i. e. of 7—10 mm. in length have been caught, which proves that another spawning takes place off Ice-

land in the month of July, and as will subsequently appear, this spawning is continued during the early part of August. The localities of quite small herring fry, are on the south and west coasts of Iceland, between Portland and Faxe Bugt (Fig. 5). Larger specimens have, by the way, practically only been found off the same coasts of Iceland as in the month of June. The northernmost specimens have been taken off Kap Nord on the north-west coast. With the exception of a single, particularly large specimen (42 mm.), already faintly silvery in appearance and taken in the waters between Vopnafjord and Lodmundarfjord, not a single herring postlarva has been taken along the north and east coasts of Iceland, in spite of a large quantity of stations.

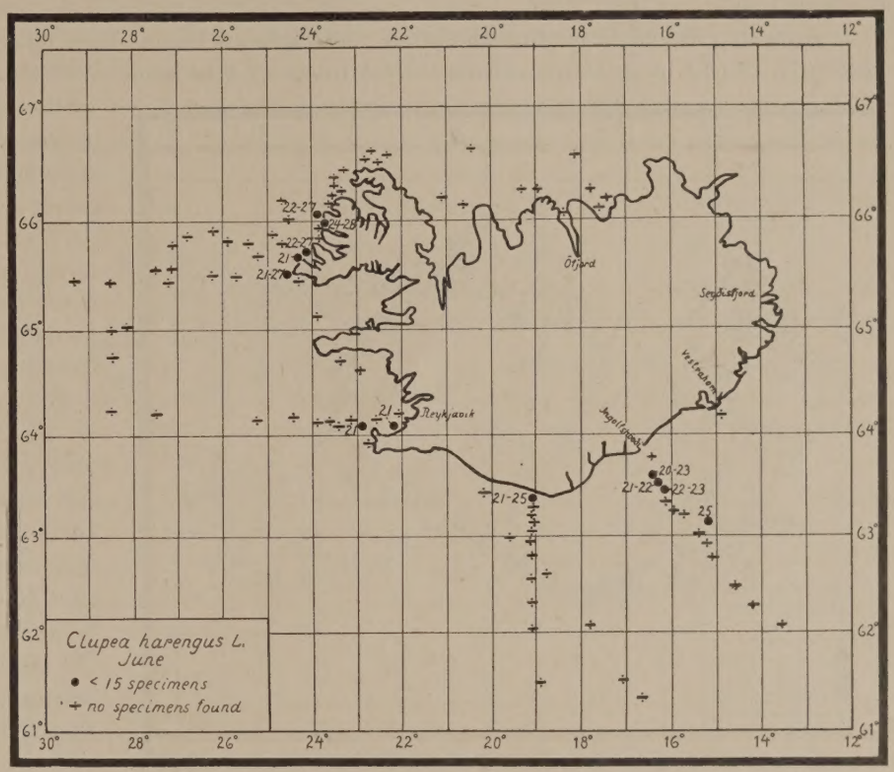

Fig. 4. The distribution of the postlarval stages of the herring at Iceland in June. The figures denote size of smallest and largest specimens in mm.

August. The investigations carried on during the month of August comprise all the coasts of Iceland, with the exception of the distance from Hornefjord to Portland, from which at this time of the year no researches are at hand. Quite small herring young have been found from the Vestman Islands along the west coast as far as Isafjordsdjup (Fig. 6). In greatest quantities quite small postlarval stages of herring have been found in Faxe Bugt, but there is hardly any doubt that the herring during the months of July and August spawn off the whole of the west coast. Off the north and east coasts herring young have, by the way not been found, with the exception that 2 specimens (41 and 43 mm. in length) have been caught between Vopnafjord and Lodmundarfjord on the east coast, in nearly the same locality where the above-mentioned specimen was caught in the month of July. As late as August 29th, 1904, quite small herring fry (below 10 mm.) were found in Faxe Bugt in rather large quantities, but at the end of August the herring fry, hatched during the later part of the summer, seem to have attained an average length of 12—13 mm.

The result of the investigations carried on as to the spawning of the herring off Iceland then briefly becomes as follows:

The herrings spawn off Iceland within two distinct periods, viz. during the spring in the months of March and April and during the summer in the months of July and August. As investigations have not been made off Iceland at an earlier time of the year, no particulars can be given as to the time when the spring spawning commences. The Danish investigations carried on during the months of May and June in Iceland waters have not, like the April investigations, brought to light quite small herring postlarvæ (total length below 10 mm.), and there is consequently hardly any spawning worth mentioning

within the period from May till the early part of July. In the middle of July the quite small postlarval stages of herring are once more met with, and the latter are found — in steadily decreasing numbers — as late as towards the end of August, when the Danish investigations off Iceland cease.

From the material at hand it appears that the two spawnings, the spring and the summer one, do not take place within quite the same area, the spring spawning only takes place off the south coast of Iceland, whereas the summer spawning not only takes place along the south coast, but also along the west coast.

In the regions from Ingolfshøfdi to the Vestman Islands very large quantities of herring young have been caught in April, measuring a total length of 8—13 mm. Whereas in a single haul more than 1400 herring postlarvæ have been caught in these waters, only quite few specimens (8 at most) have been caught in a single haul off any other part of the shore, and the latter having a relatively greater length it must be supposed that the current has already carried them some distance from the spawning place.

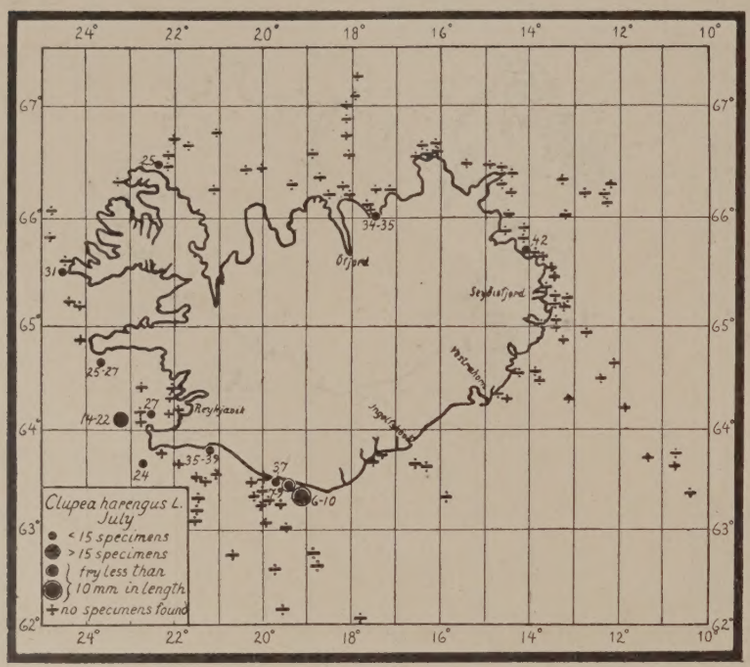

Fig. 5. The distribution of the postlarval stages of herring at Iceland in July. The figures denote size of smallest and largest specimens in mm.

The summer and autumn spawning on the other hand appear to take place over a comparatively larger area, and principally on the south-west and west coasts of the island. At South Iceland there have however on July 18th, 1903, off Vestman Islands been caught rather large quantities (89 specimens) of newly hatched herring postlarvæ (6—10 mm.). Apart from that quite small postlarval stages of herring have been caught during the months of July and August round Reykjanes, in Faxe Bugt and along the west coast as far as Bredefjord. These finds agree with the information supplied by SÆMUNDSSON (1909) that the summer spawning of the herring takes place in the regions Eldeybanke to Bredefjord.

The postlarval stages of herring have exclusively been taken over shallow depths, rather near the shore. A single specimen caught above a depth of 332 m. forms an exception, but apart from this specimen all the postlarval stages of herring off Iceland have been caught over smaller depths than 150 m, and of the latter by far the greater part have been caught inside the 100 metres line. In this respect the herring young distinguish themselves from the "lodde" young, the latter — as will be shown later on — appearing not infrequently over very deep water, and they have been caught, though in small quantities, in all the waters between Iceland and the Færoes. This difference between the two species is presumably due to the fact that the postlarval stage in the development of the "lodde" is of considerably longer duration than in the case of the herring, and that the latter can consequently be carried over larger areas by the prevailing currents.

When summing up the results of the various investigations the following picture presents itself as to the existence of the herring off Iceland:

During the early months of the spring the herrings spawn off the south coast of Iceland. In May they occur rather frequently in Faxe Bugt, and during the summer they appear in large quantities off the north and east coasts of Iceland, where a very large fishery is carried on. The largest herring fishery takes place off North Iceland during the period July—September, in the waters from Kap Nord on North-west Iceland to Kap Langanes on North-east Iceland (cf. JOHS. SCHMIDT 1904, pp. 130—132). The greater part of the large quantities of herrings which towards the autumn are caught off North Iceland, are undoubtedly herrings which at a later period would have spawned off the south coast. During the season of capture the herrings are very fat and fine, having a length of 30—40 cm., and they all show undeveloped reproductive organs so that the possibility of their being spawning herrings is excluded. This agrees well with the fact that in the researches along the north coast of Iceland practically no postlarval stages of herring have been found.

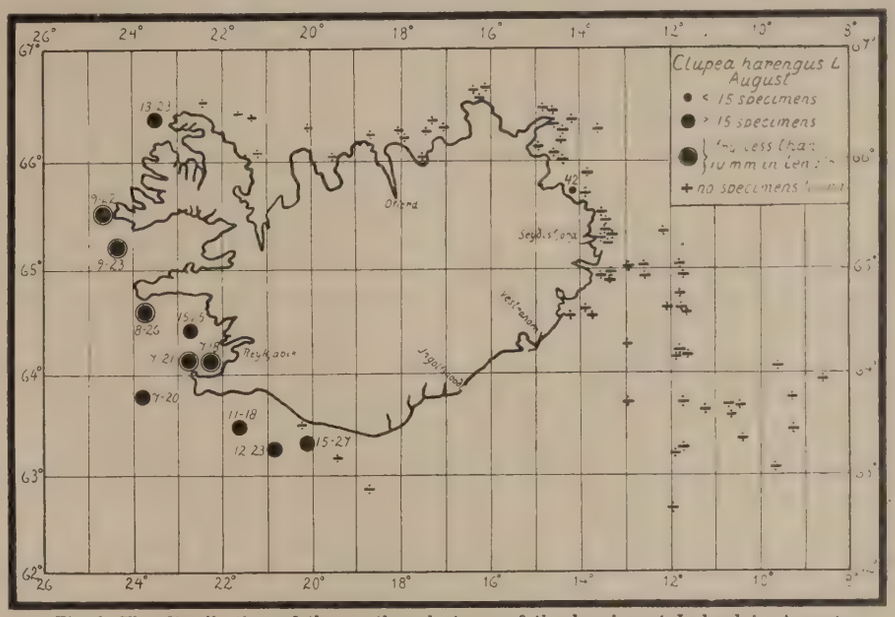

Fig. 6. The distribution of the postlarval stages of the herring at Iceland in August. The figures denote size of smallest and largest specimens in mm.

It is a fact that every autumn large quantities of herring are found along the north and east coasts of Iceland. The herring do however, not always enter the long and deep fjords, but keep out at sea, where they are caught by means of purse seines and drift nets.

The following extract from Dr. SCHMIDT's journal shows the immense quantities of herrings which at times appear in the fjords of North Iceland during the late part of the summer.

"Reykjarfjord, August 23, 1904: In front of the anchoring station off the trading place enormous quantities of large herrings were caught in the course of the afternoon and night, and these fish made the waters boil and foam while hunting for small ammodytes. There were such quantities of herrings that from the Thor within an hours time twelve were taken with one stroke haul, though the shoals often withdrew from the ship. The herrings measured 30—40 cm. and were on an average very fine and fat, but with undeveloped reproductive organs. Their stomachs only contained ammodytes, and thus a herring of 35 cm had twelve ammodytes (*Ammodytes lancea*?) measuring 8—9 cm. in its stomach. These ammodytes occurred in such dense masses that by means of one dip with a shrimp-net from the ship it was possible to take about 3000 specimens (length 6—14 cm.)."

In the fishery report for 1901—1902 we find the following observations of herring shoals, made on the cruise of the schooner "Diana" off Iceland in 1902.

"July 1. Many smaller herring shoals visible 2—10 miles north of Siglufjord.

July 18 and the following two days larger herring shoals visible to the north-east of Kap Nord and at the mouth of Hunafloi at a distance of 2—10 miles off the shore.

July 25. Large herring shoals off Hrolfsker and at the mouth of Eyjafjördr.

August 4. Many small herring shoals outside Skagi, within ½ mile from Skagata, as well as off Skagafjördr and in Hagenesvik.

August 20. Large herring shoals close outside Siglufjördr."

Investigations carried out by Lea (Hjort 1910) and A. C. Johansen (1919) prove that the greater part of the herrings which in the summer occur off North Iceland, spawn during the spring. Judging by the above results it is rather a foregone conclusion that the spawning grounds of the North Iceland herring are to be found along the south and west coasts of Iceland, and that no spawning takes place off North Iceland.

Whereas all investigations seem to prove that the herrings spawning during the spring have attained maturity off North Iceland, we have as yet no information as to whether the same holds good of the herrings spawning during the summer, or whether the latter exclusively frequent the warmer water.

II. The Færoes.

As to the spawning conditions of the herring off the Færoes only little is known, and the material at hand is not sufficiently comprehensive to give further information of spawning grounds and the probable spawning seasons off the Færoes. Upon the whole it must be said that the material of postlarval stages of herring collected off the Færoes, is comparatively insignificant considering the fact that comprehensive marine-biological investigations have been carried on in the waters round these islands. The cause of this is presumably that no researches of importance have been made — on account of the investigations off Iceland — during the period when postlarval stages of herring are to be found in greater quantities, the investigations off the Færoes being chiefly restricted to the months of May and August. In the time from the middle of May to the middle of August practically no researches have been made, with the exception of some investigations carried on in 1910 from the marine research steamer "Thor" and in 1913 from the motor schooner "Margrethe".

In 1903 towards the end of August large shoals of herring postlarvæ were found in Trangisvaag (average length about 27 mm.) (cf. Johs. Schmidt 1904, p. 83), and in June 1913 large quantities of herring young were caught in the same fjord, measuring an average length of 11—12 mm. As postlarvæ of herring have been found at midsummer in Trangisvaag Fjord, this cannot very well be considered a local phenomenon. That postlarval stages of herring have not been found anywhere else at the Færoes, is presumably due to the fact that at midsummer investigations have not been made anywhere else but in Trangisvaag Fjord.

From the material at hand it is impossible to say anything about the number of spawning seasons. The only thing that has been proved beyond a doubt is that at the end of May and the early half of June only quite small herring fry (below 10 mm.) are found in the fjords of Suderø. It must consequently be supposed that spawning takes place here about the month of May, and that the herring postlarvæ, found in August and measuring an average length of 27 mm. presumably date from this spawning.

During the latter part of August large quantities of postlarval stages of herring (average length 27 mm.) have, as mentioned above, been found in Trangisvaag Fjord. It is rather curious that no herring fry whatsoever have been caught in the course of investigations carried on at the same time of the year in other localities off the Færoes. Whether this is due to the fact that the herrings only spawn in the fjords of Suderø or possibly to deficient investigations must for the present remain an open question.

It is very much to be wished that more thorough investigations may be undertaken with regard to the occurrence of the herring and the spawning conditions off the Færoes.

"Lodde" (Mallotus villosus O. Fr. Müller).

As is wellknown the "lodde" appear in very large quantities off Iceland. They occur along all the coasts, often sporadically, which at any rate in part is due to their migrations; also, the quantities in which they occur are extremely varying in the various years.

In the early spring the "lodde" appear in large quantities off the south and south-west coast of Iceland, which fact bears upon the spawning. It has further been proved that the "lodde" undertakes migrations north of Iceland during the spring and summer season, so that they only appear off the north and east coasts in May and June, which migration also undoubtedly bears upon their spawning off these coasts. Thus quite small postlarval stages of "lodde" are first found off the south and southwest coasts, then off the west and north coasts and last of all on the east coast.

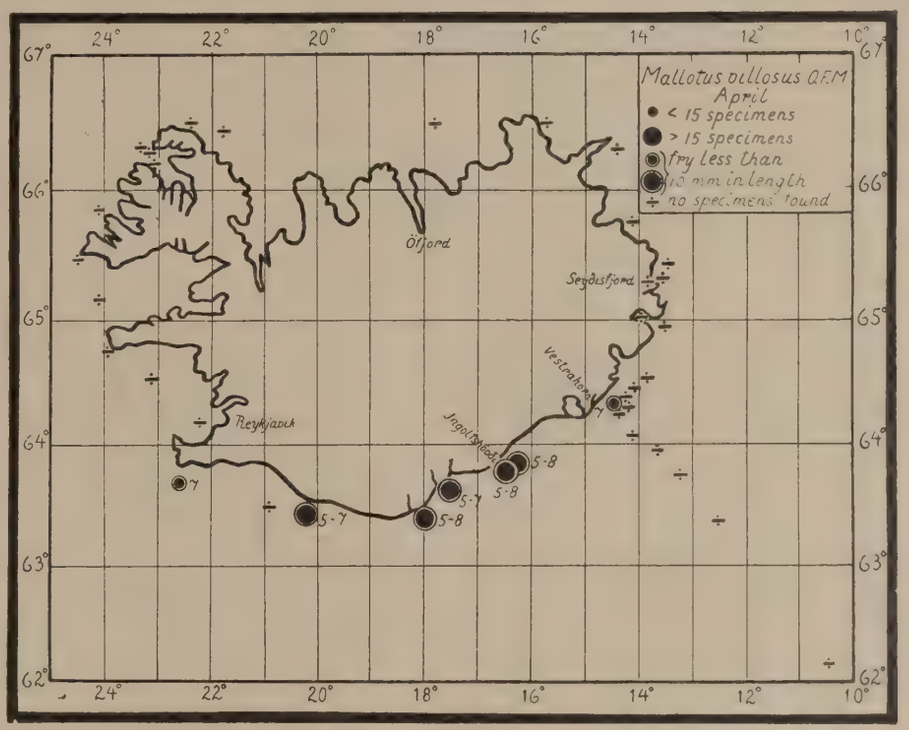

Fig. 7. The distribution of the postlarval stages of the "lodde" at Iceland in April. The figures denote size of smallest and largest specimens in mm.

The investigations during the various months give the following results:

April. During the month of April from the 16th to the 28th (1904) investigations have been carried on all round Iceland, and on this cruise "lodde" postlarvæ have only been found off South Iceland, from Eystrahorn to Reykjanes, whereas "lodde" young have been caught neither off West, North nor East Iceland (Fig. 7). In April the "lodde" thus exclusively spawn off the south coast of Iceland. On the south coast "lodde" postlarvæ have been caught at all stations over low depths and often in enormous quantities. In a single haul, of twenty minutes' duration, with the young-fish trawl about 5900 "lodde" young have been caught. In six hauls with the young-fish trawl (each of 20 minutes' duration) about 10450 "lodde" postlarvæ have been taken, i. e. an average catch of 1742, which gives a fairly good idea of the enormous quantities in which at this time of the year the "lodde" young occur along the south coast of Iceland. All of these "lodde" young are quite small (length varying from 5—8 mm). The average length is smallest between Ingolfshöfdi and Portland, i. e. 5 mm., and from there it increases in an easterly (5.8—5.8—7.0 mm.) as well as in a westerly direction (5.7—6.0—7.0 mm). The specimens are caught over depths from 27—130 m.

The reason why, during the month of April, the "lodde" spawn off the south coast of Iceland and not along the other shores of this island, must undoubtedly be sought in the hydrographical conditions. The mean temperature of the surface water in April is at South Iceland (Vestman Islands) 6.1°, whereas at Northwest Iceland (Stykkisholm) it is only 2.0°, at North Iceland (Grimsey) 1.4° and at East Iceland (Papey) 1.5° (Johs. Schmidt 1909). At this time of the year the "lodde" thus migrates to the warmest water in order to spawn.

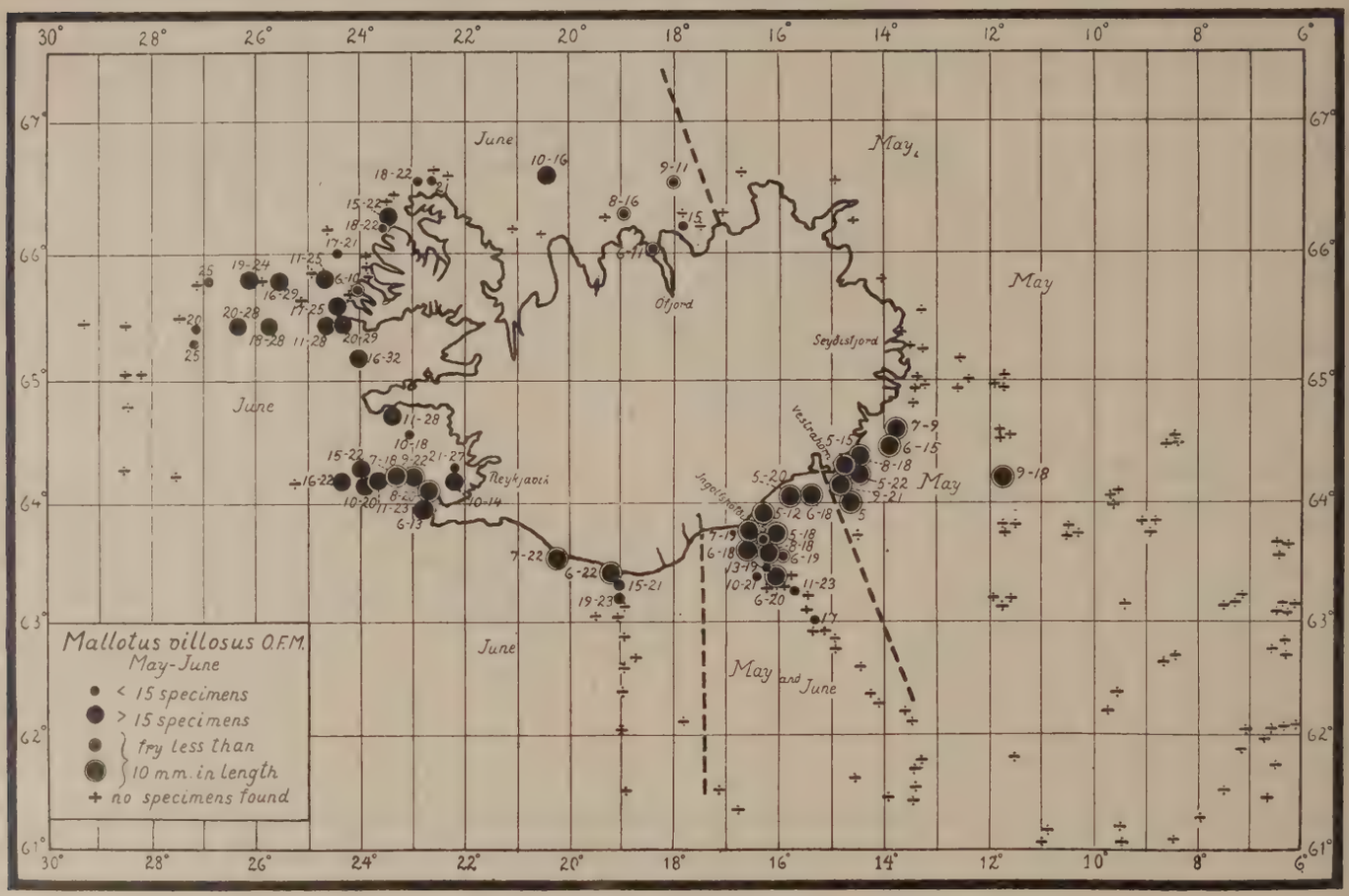

Fig. 8. The distribution of the postlarval stages of the "lodde" at Iceland in May and June. The figures denote size of smallest and largest specimens in mm.

May. For the month of May investigations are unfortunately only at hand from South-east Iceland and East Iceland, so that it is impossible to follow the course of the spawning off the other coasts of Iceland. At South-east Iceland "lodde" postlarvæ have been caught in considerable quantities in the waters from Ingolfshöfdi as far as off Berufjord, but north of this fjord no "lodde" young have been taken, even though fishing has taken place at various stations along East Iceland to Skjalfandi Bugt on North Iceland (Fig. 8). As the "lodde" later in the year spawn in rather large quantities off East Iceland, it must be supposed that the reason why no spawning takes place in the months of April and May is to be sought in the low temperature. The mean temperature for the months of April and May is at the surface off East Iceland (Papey) 1.5° and 3.2° respectively, whereas at South Iceland it is 6.1° and 7.7° respectively. (Johs. Schmidt 1909). The average lengths vary between 5 and 19 mm. There

are at this time of the year a fair amount of specimens below 10 mm. so that spawning undoubtedly is still taking place. Investigations for the month of May are at hand from the years 1904 and 1905, and in particular from the investigations at the last-mentioned year it appears with great clearness that the smallest postlarvæ of "lodde" are chiefly met with over small depths and the more mature specimens over greater depths. The average lengths of the "lodde" postlarvæ over the various depths are as follows: 50 metres: 6.5 mm. — 60 metres: 7.3 mm. — 65 metres: 7.6 mm. — 71 metres: 8.4 mm. — 95 metres: 10.1 mm. — 332 metres: 14.6 mm. — 500—560 metres: 15.5 mm. The largest "lodde" fry are undoubtedly found over greater depths. It is further proved that the largest "lodde" fry are on an average found deeper below the surface than the smallest ones, which will appear from the following general survey of average lengths from the various hauls:

1904 — St.	117	15	metres wire	10.6 mm.
		80	— —	12.5 —
1905 — —	45	10	— —	14.4 —
		65	— —	15.4 —
— — —	53	10	— —	6.3 —
		65	— —	6.6 —
— — —	54	10	— —	7.6 —
		65	— —	9.1 —
— — —	56	10	— —	9.6 —
		65	— —	10.9 —

June. With the exception of the eastern part of North Iceland and East Iceland investigations for the month of June are at hand from all the coasts of Iceland. The investigations have been made in the years 1903 and 1904. Postlarval stages of the "lodde" have been met with in the month of June over nearly the whole of the area investigated. In greatest quantities they are caught at South and West Iceland, but a fair amount have been taken along the coasts of North Iceland (Fig. 8). They are extremely varying in size, which seems to indicate that the spawning must extend over a fairly long period. In the month of June small specimens (below 10 mm.) have been met with locally off North Iceland, e. g. in Øfjord and in the vicinity of West Iceland at Arnarfjord and in the southern part of Faxe Bugt, but in all of these places only in relatively small numbers. At South Iceland on the other hand, e. g. off Ingolfshöfdi, at Portland and inside the Vestman Isles specimens below 10 mm. have been caught in rather large quantities during the early part of June. The spawning along the south coast of Iceland is thus still taking place during this month, and spawning takes place as well off the west as off the north coast of Iceland, though in comparatively small quantities as compared with the spawning off the south coast. As mentioned above investigations from East Iceland are not at hand, as far as the month of June is concerned, and so our knowledge of the conditions during this month along East Iceland are limited to conjectures. But judging by the low temperatures, which in the month of June still prevail at East Iceland, the most likely supposition is that the "lodde" have not commenced spawning off East Iceland, but on the strength of the investigations which have hitherto taken place nothing can be said for certain as to this point. As will appear from the chart (Fig. 8) investigations during this month (1904) have been carried on west of Iceland as far as abt. 29° 30′ W. long., and only on 27° 12′ W. long. the first specimen of "lodde" fry was taken. It measured 25 mm. and was caught over a depth of 740—768 metres (about 70 miles from the nearest coast). At nearly all of the stations situated nearer land postlarval stages of "lodde" were caught. Outside the 150 metres line practically all of the individuals measured above 20 mm. On South Iceland the first specimen of "lodde" young was caught about 55 miles from the shore on 63° 01′ N. lat., 15° 21′ W. long. It was caught over a depth of more than 1900 metres and measured 17 mm.

July. In the month of July a number of investigations have been made all round Iceland, and we consequently possess excellent information as regards the occurrence of the "lodde" young during this

month. Postlarval stages of "lodde" young are found in the month of July along all the coasts of Iceland, also — and in considerable quantities — on East Iceland, where no "lodde" fry were found during the month of May, whereas as regards the month of June we possess no knowledge of the conditions in

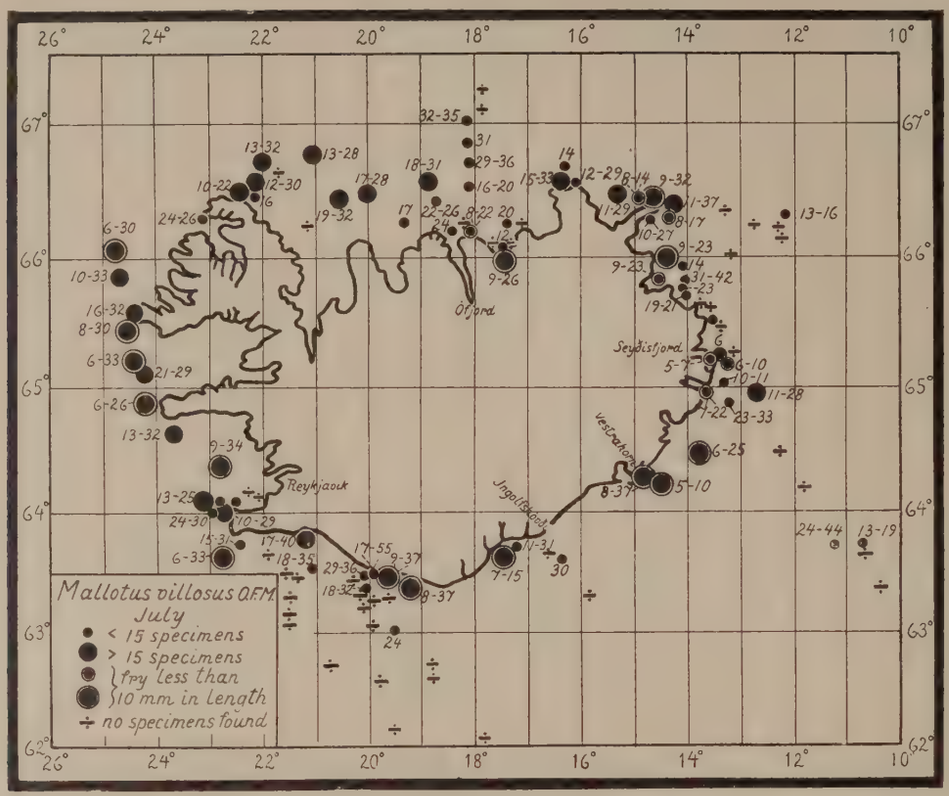

Fig. 9. The distribution of the postlarval stages of the "lodde" at Iceland in July. The figures denote size of smallest and largest specimens in mm.

those localities. Very small postlarval stages (below 10 mm.) have been met with along most of the coasts of Iceland, but an interesting fact is that by far the greater part of the small "lodde" fry during this month have been met with off East Iceland (Fig. 9). Off South and West Iceland a fair number have been caught, but the percentage of small "lodde" fry is relatively insignificant as compared with the number found on East Iceland. Along the north coast of Iceland only comparatively small postlarval stages of "lodde" have been taken. The greatest percentage of "lodde" postlarvæ measuring less than 10 mm. are the following, taken from the various parts of Iceland in the course of the month of July:

North Iceland	.....	20 %
West —	.....	44 %
South —	.....	55 %
East —	.....	100 %.

Thus there is hardly any doubt that the "lodde" at midsummer spawn in great quantities along the coasts of East Iceland and only in relatively small quantities along the other coasts of Iceland. During this month the average surface temperature is 6—7° at East Iceland, which nearly corresponds with the surface temperature at South Iceland during the month of April.

August. During the month of August investigations have been made all round Iceland, except on the south-east coast. The distribution of the "lodde" postlarvæ along the shores of Iceland is very peculiar and a further development of the July conditions. In that month no quite small "lodde" fry

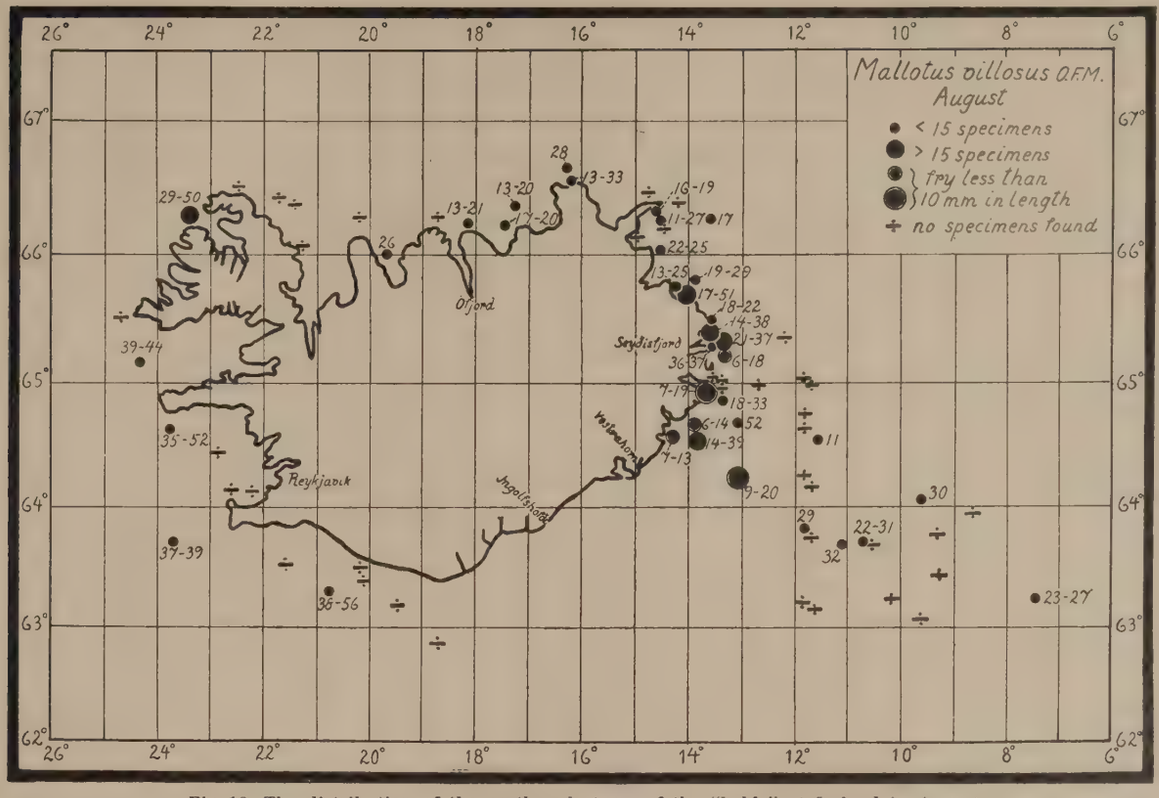

Fig. 10. The distribution of the postlarval stages of the "lodde" at Iceland in August.
The figures denote size of smallest and largest specimens in mm.

(below 10 mm.) have been found along the coasts of Iceland except at East Iceland (Fig. 10). Thus the range of variation in the size of the postlarvæ of "lodde" fry is in the various localities of Iceland:

South Iceland	.....	37—56 mm.
West	—	29—52 —
North	—	13—33 —
East	—	6—51 —

It must thus be said that the spawning grounds of the "lodde" off Iceland during the late part of the summer are limited to East Iceland. A comparison with the hydrographical conditions show that the "lodde" off Iceland at this time of the year only spawn in water with a relatively low temperature. The average temperature of the surface water in August (according to Johs. Schmidt 1909) is as follows:

South Iceland, Vestman Islands	10.8°
North-west Iceland, Stykkisholm	10.7°
North Iceland, Grimsey	8.0°
East Iceland, Papey	6.9°

As regards the distribution of the "lodde" young it must further be noted that they have been met with southeast of Iceland at a very considerable distance from the shore, but those are exclusively rather large fry. The reason why they are carried so far away from the shore is beyond a doubt to be sought in the peculiar current conditions at the south-eastern corner of Iceland, where the cold water meets the warmer water of the south coast. Along East Iceland, in a southerly direction, runs as is well known the Icelandic Polar Current, and it seems a likely supposition that it is this current which when meeting the warm Atlantic waters at Southeast Iceland turns in a south-easterly direction and thus carries the postlarval stages of the "lodde" away from the shore in the direction of the Færoes. (Compare the charts May—June and July—August. Fig. 8 and figs. 9—10). It must consequently be supposed that all of the "lodde" young — and they are relatively very few — which have been met with in the vicinity of the Færoes have not been spawned in these waters but at Iceland, from where they have been carried away by the current. As is well-known the "lodde" only very rarely appear off the Færoes.

When comprising the results of the investigations from the single months we get the following picture of the spawning conditions of the "lodde" off Iceland during the period April—August:

In the early spring the "lodde" spawn exclusively off South Iceland, where the warmest water is to be found (surface temperature about 6°). According as the water along the west and north coasts becomes warmer, the spawning area of the "lodde" is extended so as also to comprise these regions, and finally the waters along the east coast have attained such a temperature that the "lodde" also spawn along this part of the Icelandic coasts. The east coast, as is well known, has the lowest temperatures all the year round. Off the east coast spawning takes place at the earliest in June or possibly not till July.

The spawning off South Iceland principally takes place in the spring and decreases in the course of the summer. During the month of August the spawning here as well as off the other coasts of Iceland — East Iceland excepted — seems to be at an end. The explanation of this must presumably be sought in the prevailing relatively high temperature (surface temperature 8—10°). In August the surface temperature off East Iceland was only 6—8°, and even then quite small "lodde" postlarvæ (below 10 mm) are found.

The spawning period extends over the following months at South and South-east Iceland:

South Iceland	April—July
East —	July (June?)—August (September?)

Catch of postlarval stages of Herring (*Clupea harengus*, L.) and of "Lodde" (*Mallotus villosus*, O. Fr. Müller) at Iceland and the Færoes in the years 1903, 1904, 1905, 1908 and 1913.

St. Nr.	Date	Hour	Position Lat. N.	Position Long. W.	Depth metres	Wire out metres	Duration of haul in minutes	*Clupea harengus*, L. < 10 mm.	*Clupea harengus*, L. 10—15 mm.	*Clupea harengus*, L. 15—25 mm.	*Clupea harengus*, L. > 25 mm.	*Clupea harengus*, L. Number of specimens	*Mallotus villosus*, O. F. M. < 10 mm.	*Mallotus villosus*, O. F. M. 10—15 mm.	*Mallotus villosus*, O. F. M. 15—25 mm.	*Mallotus villosus*, O. F. M. > 25 mm.	*Mallotus villosus*, O. F. M. Number of specimens
	1903																
60	30/5 03	»	Eystra Horn, Iceland		90	»	10	..	..	..	..	..	6	..	..	..	6
61	»	»	Vigr, Iceland		30	Surface	10	..	..	..	..	..	5	..	..	..	5
62	»	10[15] pm.	64°19′	14°36′	60	»	10	..	..	..	..	..	29	18	5	..	52
65	31/5 03	11[30] pm.	64°00′	14°40′	160	»	10	..	..	..	..	..	1	..	..	..	1
66	1/6 03	12[30] am.	64°10′	14°56′	98	»	10	..	..	..	..	..	1	4	4	..	9
68	»	»	63°39′	16°25′	90	»	10	..	..	3	..	3	83	13	3	..	215
70	»	»	63°35′	16°15′	100	»	10	..	..	2	..	2	17	13	12	..	42
72	»	»	63°30′	16°08′	112	»	10	..	..	2	..	2	13	24	63	..	105
74	»	5[00] pm.	63°25′	16°04′	163	»	10	..	..	..	..	..	..	7	8	..	15
78	»	»	63°13′	15°04′	c.1150	»	10	..	..	1	..	1	..	2	17	..	19
81	»	»	63°01′	15°21′	c.1900	»	10	..	..	..	..	..	..	..	1	..	1
99	4/6 03	»	63°13′	19°05′	c. 380	»	10	..	..	..	..	..	..	..	9	..	9
101	»	»	63°19′	19°06′	130	»	10	..	..	..	..	..	..	2	16	..	18
102	»	»	63°22′	19°08′	61	»	10	..	..	2	..	2	41	12	9	..	62
106	5/6 03	»	63°30′	20°12′	c. 76	»	10	..	..	..	..	..	27	25	22	..	74
109	»	»	63°56′	22°44′	140	»	10	..	..	..	..	..	4	2	..	..	6
110	10/6 03	9[00] am.	64°10′	22°17′	34	»	10	..	..	1	..	1	..	18	..	..	18
»	»	»	»	»	»	150	10	..	..	..	..	..	..	9	..	..	9
111	»	»	64°07′	22°42′	46	Surface	10	..	..	..	..	..	2	40	10	..	52
112	»	12[00] m.	64°10′	22°58′	72	»	10	..	..	1	..	1	1	35	35	..	71
113	»	»	64°10′	23°10′	81	»	10	..	..	..	..	..	2	10	2	..	14
114	»	4[30] pm.	64°10′	23°22′	110	»	10	..	..	..	..	..	..	26	74	..	153
115	»	»	64°10′	23°34′	120	»	10	..	..	..	..	..	1	22	77	..	132
116	»	11[00] pm.	64°10′	23°51′	158	»	10	..	..	..	..	..	..	2	16	..	18
117	11/6 03	1[30] am.	64°10′	24°21′	297	»	10	..	..	..	..	..	..	..	20	..	20
130	13/6 03	»	66°13′	23°35′	45	»	10	..	..	..	..	..	..	..	2	..	2
131	14/6 03	»	66°07′	23°47′	»	»	10	..	..	6	3	9	..	..	..	..	..
133	15/6 03	»	66°04′	23°36′	32	»	10	..	..	1	3	4	..	..	..	..	..
134	15/6 03	10[30] pm.	66°15′	23°30′	60	Surface	10	..	..	..	..	..	..	..	27	..	27
»	»	»	»	»	»	40	10	..	..	..	..	..	..	..	36	..	36
135	16/6 03	»	66°33′	22°47′	92	Surface	10	..	..	..	..	..	..	..	1	..	1
136	15/6 03	»	66°30′	22°57′	42	40	10	..	..	..	..	..	..	..	2	..	2
139	17/6 03	8[30] pm.	66°39′	20°29′	62	Surface	20	..	..	..	..	..	..	46	3	..	49
»	»	»	»	»	»	interm.	20	..	..	..	..	..	..	1	..	..	1
140	18/6 03	3[15] am.	66°15′	18°58′	70	Surface	20	..	..	..	..	..	1	6	1	..	8
»	»	»	»	»	»	40	20	..	..	..	..	..	..	..	1	2	3
142	19/6 03	»	66°01′	18°16′	95	»	10	..	..	..	..	..	7	3	..	..	10
144	27/6 03	»	66°12′	17°47′	76	Surface	10	..	..	..	..	..	..	1	..	..	1
146	30/6 03	»	66°36′	18°06′	105	»	20	..	..	..	..	..	1	1	..	..	2
148	1/7 03	»	66°06′	17°38′	205	»	20	..	..	..	..	..	..	1	..	..	1
150	2/7 03	»	66°17′	19°22′	114	»	20	..	..	..	..	..	..	..	1	..	1
152	»	»	66°29′	22°23′	48	»	20	..	..	1	..	1	..	..	1	..	1
153	3/7 03	»	66°19′	23°22′	114	»	20	..	..	..	..	..	..	..	1	1	2
154	»	»	65°29′	24°34′	42	»	20	..	..	..	1	1	..	..	84	16	190

St. Nr.	Date	Hour	Position Lat. N.	Position Long. W.	Depth metres	Wire out metres	Duration of haul in minutes	*Clupea harengus*, L. < 10 mm.	*Clupea harengus*, L. 10—15 mm.	*Clupea harengus*, L. 15—25 mm.	*Clupea harengus*, L. > 25 mm.	*Clupea harengus*, L. Number of specimens	*Mallotus villosus*, O. F. M. < 10 mm.	*Mallotus villosus*, O. F. M. 10—15 mm.	*Mallotus villosus*, O. F. M. 15—25 mm.	*Mallotus villosus*, O. F. M. > 25 mm.	*Mallotus villosus*, O. F. M. Number of specimens
155	4/7 03	12^20 am.	65°11′	24°18′	70	»	20	..	..	..	..	..	..	..	8	9	17
156	»	»	64°39′	23°40′	91	»	20	..	..	1	1	2	..	4	74	22	115
157	»	»	64°23′	22°52′	88	»	20	..	..	..	..	..	1	1	1	3	6
»	»	»	»	»	»	80	10	..	..	..	..	..	..	4	8	..	12
158	»	»	64°17′	22°23′	46	Surface	20	..	..	..	..	..	..	1	3	1	5
»	»	»	»	»	»	50	20	..	..	..	..	..	..	..	2	..	2
160	10/7 03	»	64°05′	22°39′	40	Surface	20	..	..	..	..	..	..	5	5	1	11
»	»	»	»	»	»	40	20	..	..	..	..	..	..	15	2	..	17
161	11/7 03	»	64°07′	22°43′	38	Surface	10	..	..	..	..	..	..	..	1	1	2
163	12/7 03	»	63°24′	22°02′	135	»	20	..	..	..	..	..	..	..	1	..	1
»	»	»	»	»	»	100	20	..	..	..	..	..	..	..	..	1	1
173	17/7 03	»	63°24′	20°02′	140	Surface	20	..	..	..	..	..	..	..	2	..	2
175	18/7 03	»	63°30′	20°00′	75	»	20	..	..	..	..	..	..	..	..	3	3
176	»	»	63°27′	19°37′	65	»	20	4	..	..	..	4	1	14	7	12	34
177	»	»	63°21′	19°08′	65	»	20	86	3	..	..	89	5	32	15	31	83
178	19/7 03	»	63°42′	17°34′	70	Surface	20	..	..	..	..	..	11	9	..	..	20
»	»	»	»	»	»	>70	20	..	..	..	..	..	..	..	..	1	1
180	»	»	63°39′	16°18′	100	150	20	..	..	..	..	..	..	..	..	1	1
182	20/7 03	»	64°18′	14°32′	103	Surface	20	..	..	..	..	..	84	2	..	..	86
183	»	»	64°34′	13°56′	64	»	20	..	..	..	..	..	32	3	2	..	37
184	»	»	65°11′	13°23′	93	»	20	..	..	..	..	..	3	1	..	..	4
187	26/7 03	»	65°30′	13°31′	50	»	20	..	..	..	..	..	3	..	..	..	3
192	31/7 03	»	64°59′	13°49′	135	50	15	..	..	..	..	..	3	1	1	..	5
193	3/8 03	»	64°33′	14°18′	46	Surface	20	..	..	..	..	..	7	2	..	..	9
197	5/8 03	5^00 am.	64°35′	11°45′	420	»	10	..	..	..	..	..	..	1	..	..	1
	1904																
9	15/4 04	6^40 pm.	64°20′	14°15′	99	15	20	..	1	..	..	1	..	..	..	..	..
12	»	9^20 pm.	64°21′	14°27′	63	15	20	..	7	..	..	7	..	..	..	..	..
14	16/4 04	6^50 am.	63°50′	16°31′	59	15	20	..	5	..	..	5	31	..	..	..	31
16	»	4^20 pm.	63°40′	17°35′	34	15	20	4	33	..	..	37	100	..	..	..	2800
17	»	10^30 pm.	63°25′	18°00′	102	10	10	5	4	..	..	9	100		..	..	105
»	»	»	»	»	»	15	20	14	186	..	..	1330	100	..	..	..	5900
18	17/4 04	7^30 am.	63°26′	20°11′	50	15	20	8	92	..	..	1465	100	..	..	..	1540
20	19/4 04	8^30 pm.	63°44′	22°36′	130	Surface	10	..	..	..	..	..	1	..	..	..	1
23	22/4 04	0^45 am.	64°34′	23°07′	80	15	20	..	5	..	..	5	..	..	..	..	..
24	»	5^25 am.	64°49′	23°59′	68	15	20	..	2	..	..	2	..	..	..	..	..
35	24/4 04	6^40 am.	66°28′	15°48′	68	15	20	..	..	2	6	8	..	..	..	..	..
36	»	0^25 pm.	66°17′	14°22′	65	15	20	..	..	1	..	1	..	..	..	..	..
38	»	9^00 pm.	65°27′	13°30′	50	15	20	..	..	..	2	2	..	..	..	..	..
40	27/4 04	6^40 am.	65°19′	13°40′	74	15	20	..	..	..	1	1	..	..	..	..	..
44	»	6^30 pm.	64°24′	14°22′	70	70	10	..	..	..	1	1	..	..	..	..	..
45	»	8^40 pm.	64°20′	14°28′	67	15	20	..	..	1	..	1	1	..	..	..	1
»	»	»	»	»	»	60	10	..	..	1	..	1	..	..	..	..	..
47	28/4 04	5^15 am.	63°50′	16°28′	27	Surface	10	..	3	..	..	3	15	..	..	..	15
»	»	»	»	»	»	15	20	..	5	1	..	6	100	..	..	..	180
113	24/5 04	6^00 pm.	63°31′	16°06′	116	15	20	..	..	9	..	9	..	23	54	..	77
114	»	8^20 pm.	63°39′	16°20′	105	15	10	..	..	7	..	7	6	22	15	..	43
115	»	10^30 pm.	63°51′	16°25′	60	15	20	..	..	12	..	12	17	47	36	..	119
116	27/5 04	7^50 am.	64°01′	15°36′	74	15	10	..	..	3	..	3	8	14	5	..	27
117	»	0^50 pm.	64°19′	14°32′	75	15	10	..	..	..	..	..	6	12	1	..	19
»	»	»	»	»	»	80	10	..	..	7	..	7	8	77	15	..	590
118	»	5^45 pm.	64°34′	13°55′	78	15	10	..	..	..	..	..	4	40	1	..	45
»	»	»	»	»	»	80	10	..	..	..	..	..	1	2	..	..	3
138	14/6 04	6^30 am.	66°01′	24°32′	50	15	15	..	..	..	..	..	..	..	6	..	6
146	17/6 04	12^30 pm.	65°52′	23°58′	60	55	15	..	..	..	..	..	2	1	..	..	3
147	»	10^50 pm.	65°53′	24°45′	70	15	15	..	..	..	..	..	..	1	15	..	16
»	»	»	»	»	»	75	30	..	..	..	..	..	..	..	28	..	28
148	18/6 04	2^35 am.	65°52′	25°32′	115	15	15	..	..	..	..	..	..	..	44	1	45
»	»	»	»	»	»	120	20	..	..	..	..	..	..	..	100	..	132
149	»	7^00 am.	65°52′	26°12′	270	15	15	..	..	..	..	..	..	..	19	..	19
»	»	»	»	»	»	250	20	..	..	..	..	..	..	..	2	..	2

St. Nr.	Date	Hour	Position Lat. N.	Position Long. W.	Depth metres	Wire out metres	Duration of haul in minutes	*Clupea harengus*, L. < 10 mm.	*Clupea harengus*, L. 10—15 mm.	*Clupea harengus*, L. 15—25 mm.	*Clupea harengus*, L. > 25 mm.	*Clupea harengus*, L. Number of specimens	*Mallotus villosus*, O. F. M. < 10 mm.	*Mallotus villosus*, O. F. M. 10—15 mm.	*Mallotus villosus*, O. F. M. 15—25 mm.	*Mallotus villosus*, O. F. M. > 25 mm.	*Mallotus villosus*, O. F. M. Number of specimens
150	»	2^{40} pm.	65°50′	26°53′	392	400	15	..	..	..	..	..	..	..	1	..	1
153	$^{20}/_{6}$ 04	1^{30} am.	65°20′	27°12′	754	15	15	..	..	..	..	..	..	..	1	..	1
154	$^{21}/_{6}$ 04	12^{30} pm.	65°27′	27°10′	730	15	60	..	..	..	..	..	..	..	1	..	1
155	»	8^{15} pm.	65°28′	26°20′	223	60	180	..	..	..	..	..	..	..	7	1	8
»	»	5^{35} pm.	»	»	»	75	30	..	..	..	..	..	..	..	13	5	18
»	»	7^{20} pm.	»	»	»	250	30	..	..	..	..	..	..	..	2	..	2
156	$^{22}/_{6}$ 04	2^{15} am.	65°28′	25°48′	150	15	120	..	..	..	..	..	..	..	7	1	8
»	»	»	»	»	»	70	120	..	..	..	..	..	..	..	21	4	25
157	»	9^{30} am.	65°29′	24°35′	37	15	60	..	..	1	..	1	..	..	2	..	2
»	»	»	»	»	»	40	60	..	..	7	3	10	..	1	18	5	24
158	»	1^{30} pm.	65°38′	24°23′	34	17	30	..	..	2	1	3		..	14	..	14
161	$^{26}/_{6}$ 04	4^{30} pm.	65°38′	24°23′	34	15	15	..	..	1	..	1	..	..	..	..	..
162	»	6^{55} pm.	65°29′	24°35′	40	15	15	..	..	..	..	..	..	..	13	5	18
»	»	»	»	»	»	40	30	..	..	..	..	..	..	..	25	19	44
163	$^{27}/_{6}$ 04	0^{20} am.	65°10′	24°05′	79	15	15	..	..	..	..	..	..	..	8	..	8
»	»	»	»	»	»	85	30	..	..	..	..	..	..	..	22	18	40
164	»	2^{00} pm.	64°44′	23°23′	79	15	15	..	..	..	..	..	..	..	1	..	1
»	»	»	»	»	»	70	30	..	..	..	..	..	..	12	11	1	24
165	»	4^{20} pm.	64°35′	23°02′	55	15	15	..	..	..	..	..	..	..	1	..	1
»	»	»	»	»	»	60	30	..	..	..	..	..	..	4	..	..	4
166	»	8^{30} pm.	64°16′	22°13′	46	50	30	..	..	..	..	..	..	..	3	1	4
171	$^{2}/_{7}$ 04	9^{20} pm.	63°46′	22°56′	150	30	15	..	..	..	..	..	..	..	5	..	5
»	»	»	»	»	»	70	15	..	..	..	..	..	..	1	4	..	5
»	»	»	»	»	»	300	20	..	..	..	..	..	..	..	2	1	3
173	$^{3}/_{7}$ 04	10^{00} pm.	64°07′	22°39′	44	50	30	..	..	..	1	1	..	2	..	..	2
174	$^{8}/_{7}$ 04	2^{40} am.	63°43′	22°22′	109	15	15	..	..	..	..	..	..	..	2	1	3
»	»	»	»	»	»	110	20	..	..	..	..	..	..	..	1	..	1
189	$^{14}/_{7}$ 04	»	63°30′	21°03′	90	50	»	..	..	..	..	..	..	..	..	3	3
»	»	»	»	»	»	100	210	..	..	..	..	..	..	..	1	..	1
191	$^{14}/_{7}$ 04	6^{00} pm.	63°50′	21°09′	23-71	50	30	..	..	..	..	..	..	..	79	21	112
»	»	»	»	»	»	75	30	..	..	..	..	..	..	..	20	13	33
»	»	11^{00} pm.	»	»	»	100	30	..	..	..	3	3	..	..	40	60	745
»	»	»	»	»	»	150	15	..	..	..	2	2	..	..	16	16	32
»	$^{15}/_{7}$ 04	0^{50} am.	»	»	»	225	30	..	..	..	1	1	..	..	7	21	28
194	$^{16}/_{7}$ 04	11^{20} pm.	63°27′	19°37′	52	70	20	..	..	..	..	..	..	..	..	3	3
»	»	»	»	»	84	85	20	..	..	..	..	..	..	..	5	13	18
»	»	0^{20} am.	»	»	32	100	40	..	..	..	1	1	..	..	19	6	25
»	»	»	»	»	84	175	20	..	..	..	..	..	..	..	2	14	16
196	$^{17}/_{7}$ 04	9^{59} am.	63°42′	17°36′	35-75	15	30	..	..	..	..	..	..	1	4	..	5
»	»	»	»	»	»	80	30	..	..	..	..	..	..	1	3	..	4
»	»	»	»	»	»	200	30	..	..	..	..	..	..	1	2	1	4
197	»	11^{45} pm.	64°18′	14°38′	50	15	15	..	..	..	..	..	7	4	13	1	25
»	»	»	»	»	»	70	15	..	..	..	..	..	15	35	11	..	61
198	$^{18}/_{7}$ 04	9^{20} am.	65°05′	13°23′	59-76	70	15	..	..	..	..	..	..	2	..	..	2
200	$^{19}/_{7}$ 04	9^{50} pm.	65°18′	13°41′	80	15	15	..	..	..	..	..	5	..	..	..	5
202	$^{20}/_{7}$ 04	7^{45} am.	65°54′	14°12′	165	70	15	..	..	..	..	..	..	1	..	..	1
203	$^{20}/_{7}$ 04	12^{05} pm.	66°17′	14°27′	77	50	15	..	..	..	..	..	4	..	..	..	4
»	»	»	»	»	»	80	15	..	..	..	..	..	..	1	1	..	2
204	»	3^{30} pm.	66°26′	14°50′	58	15	30	..	..	..	..	..	2	2	..	..	4
»	»	»	»	»	»	30	30	..	..	..	..	..	1	2	..	..	3
»	»	»	»	»	»	60	30	..	..	..	..	..	..	2	..	..	2
205	»	10^{20} pm.	66°36′	16°18′	71	30	30	..	..	..	..	..	..	1	..	..	1
207	$^{21}/_{7}$ 04	10^{20} am.	66°00′	17°29′	20	100	20	..	..	..	1	1	..	..	..	2	2
208	»	5^{35} pm.	66°14′	17°28′	200	30	20	..	..	..	..	..	..	..	1	..	1
209	»	9^{30} pm.	66°33′	18°10′	76	15	30	..	..	..	..	..	..	..	2	..	2
»	»	»	»	»	»	70	30	..	..	..	..	..	..	..	1	..	1
210	$^{22}/_{7}$ 04	1^{20} am.	66°43′	18°10′	400	10	30	..	..	..	..	..	..	..	..	1	1
»	»	»	»	»	»	425	30	..	..	..	..	..	..	..	..	4	4
211	»	4^{30} am.	66°52′	18°10′	400	15	30	..	..	..	..	..	..	..	..	1	1
212	»	8^{30} am.	67°02′	18°10′	322	20	30	..	..	..	..	..	..	..	..	4	4
219	$^{29}/_{7}$ 04	»	65°40′	14°06′	47	170	20	..	..	..	..	..	..	..	..	2	2
221	$^{30}/_{7}$ 04	6^{25} am.	65°13′	13°28′	86	90	20	..	..	..	..	..	1	..	..	..	1

St. Nr.	Date	Hour	Position Lat. N.	Position Long. W.	Depth metres	Wire out metres	Duration of haul in minutes	*Clupea harengus*, L. < 10 mm.	*Clupea harengus*, L. 10—15 mm.	*Clupea harengus*, L. 15—25 mm.	*Clupea harengus*, L. > 25 mm.	*Clupea harengus*, L. Number of specimens	*Mallotus villosus*, O. F. M. < 10 mm.	*Mallotus villosus*, O. F. M. 10—15 mm.	*Mallotus villosus*, O. F. M. 15—25 mm.	*Mallotus villosus*, O. F. M. > 25 mm.	*Mallotus villosus*, O. F. M. Number of specimens
222	»	5^{00} pm.	64°48′	13°14′	126	20	20	..	..	..	..	..	..	..	1	1	2
228	$^{3}/_{8}$ 04	1^{35} am.	63°36′	6°20′	»	50	20	..	..	..	..	..	..	..	..	2	2
230	»	11^{15} pm.	63°10′	7°31′	1090	70	20	..	..	..	..	..	..	..	2	2	4
236	$^{6}/_{8}$ 04	4^{05} pm.	64°05′	9°38′	698	20	20	..	..	..	..	..	..	..	..	1	1
237	$^{7}/_{8}$ 04	0^{30} am.	63°40′	10°38′	364	70	20	..	..	..	..	..	..	..	3	2	5
239	»	4^{25} pm.	63°43′	11°45′	371	20	20	..	..	..	..	..	..	..	..	1	1
245	$^{9}/_{8}$ 04	4^{30} am.	65°16′	13°30′	50	65	15	..	..	..	..	..	..	..	..	2	2
249	$^{12}/_{8}$ 04	3^{55} am.	65°30′	13°31′	61	55	20	..	..	..	..	..	..	..	2	..	2
250	»	7^{40} am.	65°39′	14°03′	55	70	20	..	..	..	..	..	..	1	2	..	3
251	»	2^{15} pm.	66°03′	14°36′	45	50	20	..	..	..	..	..	..	..	2	..	2
254	$^{13}/_{8}$ 04	5^{00} pm.	66°16′	13°36′	280	70	20	..	..	..	..	..	..	..	1	..	1
258	$^{15}/_{8}$ 04	0^{35} am.	66°38′	16°18′	102	35	20	..	..	..	..	..	..	..	..	1	1
259	»	7^{30} am.	66°14′	17°28′	226	35	20	..	..	..	..	..	..	..	3	..	3
270	$^{25}/_{8}$ 04	0^{20} am	66°19′	23°27′	115	15	20	..	2	33	..	35	..	..	..	2	2
»	»	»	»	»	»	30	20	..	26	108	..	134	..	..	..	100	121
»	»	»	»	»	»	70	20	..	..	1	..	1	..	..	..	58	58
272	$^{26}/_{8}$ 04	»	65°29′	24°37′	45	15	20	..	2	1	..	3	..	..	..	..	..
»	»	»	»	»	»	50	20	1	11	2	..	14	..	..	..	..	..
273	»	6^{40} pm.	65°11′	24°21′	94	15	20	..	2	6	..	8	..	..	..	2	2
»	»	»	»	»	»	30	20	1	56	32	..	89	..	..	..	..	..
»	»	»	»	»	»	70	20	..	60	40	..	530	..	..	..	..	..
274	$^{27}/_{8}$ 04	2^{55} am.	64°41′	23°49′	75	15	20	..	..	3	..	3	..	..	..	..	..
»	»	»	»	»	»	30	20	..	..	3	..	3	..	..	..	..	..
»	»	»	»	»	»	70	20	4	61	33	2	240	..	..	..	3	3
275	»	8^{50} am.	64°25′	22°53′	98	15	20	..	..	7	..	7	..	..	..	..	..
»	»	»	»	»	»	30	20	..	..	91	..	91	..	..	..	..	..
277	$^{29}/_{8}$ 04	6^{25} pm.	64°07′	22°39′	45	20	20	12	2	1	..	15	..	..	..	..	..
»	»	»	»	»	»	50	20	87	11	2	..	145	..	..	..	..	..
278	»	8^{00} pm.	64°05′	22°40′	40	120	20	7	7	14	..	28	..	..	..	..	..
279	$^{30}/_{8}$ 04	0^{20} am.	63°49′	23°48′	83	15	20	..	21	3	..	24	..	..	..	..	..
»	»	»	»	»	»	70	20	8	81	11	..	325	..	..	..	3	3
»	»	»	»	»	»	95	20	8	83	9	..	135	..	..	..	..	..
280	»	8^{50} am.	63°32′	21°36′	100	70	20	..	16	4	..	20	..	..	..	..	..
282	$^{31}/_{8}$ 04	6^{15} am.	63°24′	20°03′	145	70	60	..	2	2	..	4	..	..	..	..	..
»	»	»	»	»	»	100	90	..	10	12	..	22	..	..	..	..	..
»	»	»	»	»	»	150	150	..	10	51	..	61	..	..	..	..	..
283	»	6^{00} pm.	63°20′	20°49′	124	150	180	..	..	12	2	14	..	..	..	..	..
»	»	2^{00} am.	»	»	»	50	60	..	..	9	..	9	..	..	..	..	..
»	»	»	»	»	»	100	180	..	3	78	1	82	..	..	..	2	2
	1905																
45	$^{19}/_{5}$ 05	11^{05} pm.	64°12′	11°45′	332	10	30	..	..	1	..	1	4	16	16	..	36
»	»	»	»	»	»	65	30	..	..	..	..	..	..	3	8	..	11
52	$^{23}/_{5}$ 05	5^{25} am.	64°34′	13°54′	65	10	30	..	..	..	..	..	9	..	..	..	9
»	»	»	»	»	»	65	30	..	..	..	..	..	2	..	..	..	2
53	»	8^{25} am.	64°19′	14°39′	50	10	30	..	..	1	..	1	100	..	..	..	102
»	»	»	»	»	»	65	30	..	..	12	..	12	95	5	..	..	1150
54	$^{23}/_{5}$ 05	2^{00} pm.	64°02′	15°40′	71	10	30	..	2	15	..	17	90	10	..	..	145
»	»	»	»	»	»	65	30	..	..	20	..	20	60	38	2	..	282
55	»	7^{05} am.	63°51′	16°25′	60	10	»	..	..	2	..	2	90	10	..	..	107
56	$^{25}/_{5}$ 05	6^{00} pm.	63°36′	16°29′	95	10	15	..	..	1	..	1	50	38	2	..	90
»	»	»	»	»	»	65	30	..	..	2	..	2	16	33	6	..	55
57	$^{26}/_{5}$ 05	5^{10} am.	63°21′	16°22′	550	10	90	..	..	..	..	..	..	1	..	..	1
»	»	»	»	»	»	65	100	..	..	..	..	..	..	..	1	..	1
129	$^{25}/_{7}$ 05	7^{25} pm.	62°40′	8°43′	512	25	15	..	..	..	..	..	..	..	1	..	1
130	$^{26}/_{7}$ 05	9^{30} am.	63°40′	10°38′	440	25	15	..	..	..	..	..	..	1	..	..	1
»	»	»	»	»	»	65	15	..	..	..	..	..	..	..	1	..	1
132	»	9^{30} pm.	64°35′	12°03′	330	25	15	..	..	..	..	..	..	..	1	3	4
133	$^{27}/_{7}$ 05	2^{45} am.	64°57′	12°40′	144	25	15	..	..	..	..	..	..	7	72	2	81
»	»	»	»	»	»	65	15	..	..	..	..	..	..	1	46	2	49
139	$^{29}/_{7}$ 05	»	65°50′	14°40′	20-65	25	»	..	..	..	..	..	..	2	1	..	3
»	»	»	»	»	»	65	»	..	..	..	..	..	1	1	1	..	3

St. Nr.	Date	Hour	Position Lat N.	Position Long. W.	Depth metres	Wire out metres	Duration of haul in minutes	*Clupea harengus*, L. < 10 mm.	*Clupea harengus*, L. 10—15 mm.	*Clupea harengus*, L. 15—25 mm.	*Clupea harengus*, L. > 25 mm.	*Clupea harengus*, L. Number of specimens	*Mallotus villosus*, O. F. M. < 10 mm.	*Mallotus villosus*, O. F. M. 10—15 mm.	*Mallotus villosus*, O. F. M. 15—25 mm.	*Mallotus villosus*, O. F. M. > 25 mm.	*Mallotus villosus*, O. F. M. Number of specimens
140	30/7 05	0[15] am.	66°00′	14°30′	72	25	15	..	..	..	..	..	1	1	..	..	2
»	»	»	»	»	»	65	15	..	..	..	..	..	1	11	2	..	14
141	»	5[40] am.	66°17′	14°29′	57	25	30	..	..	..	..	..	..	1	7	2	10
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	1	..	1
142	»	8[25] am.	66°25′	14°50′	60	25	30	..	..	..	..	..	1	1	5	4	11
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	2	..	2
143	»	3[10] pm.	66°37′	16°18′	85	25	30	..	..	..	..	..	..	2	1	1	4
»	»	»	»	»	»	65	30	..	..	..	..	..	..	2	1	1	4
146	31/7 05	9[10] am.	66°00′	17°29′	6-7	45	30	..	..	..	..	..	2	20	23	..	45
»	»	»	»	»	25	150	30	..	..	..	..	..	1	3	10	..	14
»	»	»	»	»	42	180	30	..	..	..	..	..	..	..	1	1	2
147	»	9[40] pm.	66°11′	18°05′	72	25	30	..	..	..	..	..	1	..	4	..	5
150	22/8 05	7[40] pm.	66°02′	19°34′	106	25	30	..	..	..	..	..	..	..	..	1	1
151	23/8 05	1[15] am.	66°11′	18°05′	85	25	30	..	..	..	..	..	..	1	2	..	3
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	1	..	1
152	23/8 05	6[50] am.	66°22′	17°20′	181	25	30	..	..	..	..	..	..	3	2	..	5
153	»	11[45] am.	66°37′	16°18′	70	65	15	..	..	..	..	..	..	2	1	1	4
154	»	6[45] pm.	66°19′	14°32′	58	25	30	..	..	..	..	..	..	2	1	1	4
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	2	..	2
155	24/8 05	4[50] pm.	65°51′	13°54′	230	25	30	..	..	..	..	..	..	..	1	2	3
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	2	1	3
156	»	8[00] pm.	65°38′	14°04′	37-12	100	30	..	..	..	2	2	..	..	8	11	19
157	25/8 05	0[25] am.	65°27′	13°31′	55	25	30	..	..	..	..	..	..	..	48	56	102
»	»	»	»	»	»	65	30	..	..	..	..	..	..	1	49	50	118
159	27/8 05	6[00] am.	65°16′	13°29′	90	25	30	..	..	..	..	..	..	..	1	12	13
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	..	2	2
160	»	10[35] am.	64°55′	13°25′	170	25	30	..	..	..	..	..	..	..	..	1	1
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	1	..	1
161	»	2[55] pm.	64°33′	13°50′	88	25	30	..	..	..	..	..	..	..	1	12	13
»	»	»	»	»	»	65	30	..	..	..	..	..	..	1	1	1	3
162	»	0[55] am.	63°42′	13°02′	659	65	30	..	..	..	..	..	..	..	..	1	1
	1908																
28	2/6 08	9[20] pm.	63°01′	19°30′	540	100	30	..	..	..	..	..	..	..	1	..	1
45	2/7 08	9[30] am.	64°06′	23°14′	98	65	30	..	1	64	..	65	..	6	50	..	56
48	5/7 08	»	63°39′	22°45′	52	10	15	..	..	..	..	..	22	14	4	..	40
»	»	»	»	»	»	65	15	..	..	1	..	1	48	36	9	7	165
54	12/7 08	0[05] am.	64°52′	24°07′	90	65	15	..	..	..	..	..	8	59	31	2	101
56	»	0[10] pm.	65°11′	24°21′	85	65	15	..	..	..	..	..	44	12	27	17	335
57	»	3[30] pm.	65°29′	24°37′	45	65	15	..	..	..	..	..	15	60	20	5	1150
60	14/7 08	»	65°49′	24°49′	65	65	15	..	..	..	..	..	..	28	67	5	150
61	17/7 08	»	66°03′	24°51′	115-122	65	30	..	..	..	..	..	4	35	58	3	390
64	20/7 08	»	66°29′	22°22′	55	65	15	..	..	..	..	..	..	24	47	..	71
65	20/7 08	»	66°36′	22°13′	75	65	15	..	..	..	..	..	..	28	56	16	640
66	»	»	66°45′	22°00′	110	25	30	..	..	..	..	..	..	14	67	16	97
»	»	»	»	»	»	65	30	..	..	..	..	..	..	7	43	4	54
68	20/7 08	»	66°49′	21°08′	120	10	30	..	..	..	..	..	..	1	12	1	14
»	»	»	»	»	»	65	30	..	..	..	..	..	..	10	84	6	154
69	21/7 08	»	66°28′	20°25′	(226)	10	30	..	..	..	..	..	..	..	26	12	38
70	»	»	66°30′	20°02′	(73)	10	30	..	..	..	..	..	..	..	17	3	20
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	29	2	31
71	»	»	66°35′	18°53′	320	65	30	..	..	..	..	..	..	..	30	15	45
72	»	»	66°24′	18°42′	400	65	15	..	..	..	..	..	..	..	1	1	2
73	22/7 08	»	66°12′	18°29′	(188)	65	15	..	..	..	..	..	..	..	1	..	1
75	26/7 08	»	66°38′	16°24′	140	35	15	..	..	..	..	..	..	..	..	1	1
»	»	»	»	»	»	65	30	..	..	..	..	..	..	..	12	10	22
76	»	»	66°33′	16°22′	46	35	15	..	..	..	..	..	..	19	12	6	37
77	»	»	66°29′	15°22′	130	35	15	..	..	..	..	..	..	20	66	7	93
78	»	»	66°23′	14°24′	45	35	15	..	..	..	..	..	..	7	7	6	20
80	28/7 08	»	66°20′	12°10′	960	35	15	..	..	..	..	..	..	4	2	..	6
82	28/7 08	»	65°49′	14°12′	120	35	15	..	..	..	..	..	..	..	1	..	1
83	»	»	65°41′	14°09′	9-18	70	15	..	..	..	1	1	..	..	2	..	2

St. Nr.	Date	Hour	Position Lat. N.	Position Long. W.	Depth metres	Wire out metres	Duration of haul in minutes	*Clupea harengus*, L. < 10 mm.	*Clupea harengus*, L. 10—15 mm.	*Clupea harengus*, L. 15—25 mm.	*Clupea harengus*, L. > 25 mm.	*Clupea harengus*, L. Number of specimens	*Mallotus villosus*, O. F. M. < 10 mm.	*Mallotus villosus*, O. F. M. 10—15 mm.	*Mallotus villosus*, O. F. M. 15—25 mm.	*Mallotus villosus*, O. F. M. > 25 mm.	*Mallotus villosus*, O. F. M. Number of specimens
86	2/8 08	»	65°16′	13°29′	110	35	15	..	..	..	..	..	5	2	2	..	9
88	»	»	64°35′	13°52′	85	35	15	..	..	..	..	..	4	3	..	..	7
89	3/8 08	»	64°17′	13°00′	165	35	15	..	..	..	..	..	2	7	2	..	11
90	»	11[30] am.	63°39′	11°15′	»	35	15	..	..	..	..	..	..	..	..	1	1
	1913																
12	29/5 13	»	Trangisvaag		»	25	30	2	..	..	..	2	..	..	..	..	..
15	»	»	—		19-22	10	»	1	..	..	..	1	..	..	..	..	..
»	»	»	—		»	30	»	3	6	..	..	9	..	..	..	..	..
22	6/6 13	»	—		11-15	20	»	7	23	..	..	195	..	..	..	..	..
27	»	»	—		»	10	»	..	1	..	..	1	..	..	..	..	..
»	»	»	—		»	25	»	6	24	..	..	174	..	..	..	..	..
29	»	»	—		19-22	10	»	..	3	..	..	3	..	..	..	..	..
»	»	»	—		»	30	»	4	..	..	..	4	..	..	..	..	..
49	16/6 13	»	—		19-12	10	»	..	2	..	..	2	..	..	..	..	..
50	»	»	—		»	30	»	..	12	..	..	12	..	..	..	..	..
52	16/6 13	»	—		»	50	30	..	1	..	..	1	..	..	..	..	..
58	20/6 13	»	Vaag Fjord		»	40	»	1	..	..	..	1	..	..	..	..	..

Dansk Resumé.

Det foreliggende Materiale af postlarvale Stadier af Sild (*Clupea harengus* L.) og Lodde (*Mallotus villosus* O. Fr. Müller) fra Island og Færøerne stammer fra de af Kommissionen for Havundersøgelser, under Dr. phil. Johs. Schmidt's Ledelse, foretagne Undersøgelser i disse Farvande. Materialet er indsamlet i Aarene 1903, 1904, 1905, 1908 og 1913 og omfatter ialt ca. 5,170 Unger af Sild og ca. 21,650 Unger af Lodde. Med Undtagelse af Aaret 1913, hvor Undersøgelserne skete fra Motorskonnerten "Margrethe", er alle Undersøgelserne foretaget fra Havundersøgelsesskibet "Thor".

I Listerne vil man finde en Oversigt over det indsamlede Materiale samt Individernes omtrentlige Længde. Alle Maalinger gælder Totallængde regnet fra Hovedets forreste Kant til Basis af Caudalfinnen. Naar Prøverne har været meget store, er der som Regel kun maalt et Antal paa 100 Individer.

Sild (*Clupea harengus* L.). Silden forekommer som bekendt i meget stor Mængde ved Færøerne og Island. Den er særlig det sidstnævnte Sted Genstand for et meget stort Fiskeri og spiller derfor en fremtrædende økonomisk Rolle. Islænderne har særlig i de sidste Aartier drevet Sildefiskeri efter en større Maalestok, men langt den største Mængde Sild er dog hidtil fanget ved Island af fremmede Nationer, særlig Nordmænd.

Som det allerede i 1903 blev paavist af Dr. Schmidt (se Johs. Schmidt: "Fiskeriundersøgelser ved Island og Færøerne i Sommeren 1903"; Skrifter udgivne af Kommissionen for Havundersøgelser Nr. 1, København 1904) findes Sildens Yngleplads ved Island alene i det varmere Vand langs Sydkysten og Vestkysten, men ikke langs den kolde Nord- og Østkyst. Silden har to adskilte Gydetider ved Island, nemlig en Gydning om Foraaret (Marts—April) og en Gydning i Eftersommeren (Juli—August). Paa disse Tider er ganske spæde Unger af Sild (mindre end 10 mm.) fundet i stor Mængde paa Syd- og Vestkysten af Island, medens saadanne ikke er fundet i de mellemliggende Maaneder. Gydningen i de to Perioder foregaar ikke i ganske samme Omraade. Foraarsgydningen finder saaledes alene Sted paa Sydkysten af Island (Fig. 1), medens Gydningen om Eftersommeren ikke alene foregaar paa Sydkysten, men ogsaa paa Vestkysten af Island (Fig. 5 og 6). Sommergydningen foregaar, saaledes som det allerede er anført af Sæmundsson (1909), væsentlig paa Strækningen fra Eldeybanken til Bredefjord. Den tidligste Sildeyngel er ved Island truffet i Midten af April. Da der ikke tidligere paa Aaret er foretaget Undersøgelser ved Island, kan der intet nærmere siges om, hvor tidligt Gydningen om Foraaret begynder. Midt i Juli Maaned møder man atter de ganske spæde Sildeunger og disse kan træffes — i jævnt aftagende Antal — endnu i Slutningen af August, hvor de danske Undersøgelser ved Island ophører.

De store Mængder af Sild, der i Tiden fra Juli til September fanges paa Nordlandet, er utvivlsomt alle Sild, der gyder langs Syd- og Vestisland, da der aldrig er truffet spæde Sildeunger langs Nordlandets Kyster. Da Størsteparten af de Sild, der forekommer ved Nord-Island, iflg. Undersøgelser af Lea (Hjort 1910) og A. C. Johansen (1919) gyder om Foraaret, er det utvivlsomt, at den foraarsgydende Sild har sine Gydepladser ved Syd-Island, medens dens Opvækst foregaar paa Nordlandet. Vi ved endnu intet

om, hvorvidt det samme gælder den sommergydende Sild eller om denne muligvis udelukkende holder til i det varmere Vand.

Det foreliggende Materiale fra Færøerne er ikke saa omfattende, at det kan give nærmere Oplysning om Gydepladserne og de eventuelle Gydetider ved disse Øer. Det relativt ringe Materiale skyldes især, at der ikke er foretaget Undersøgelser af Betydning — paa Grund af Undersøgelser ved Island — i det Tidsrum, hvor der forefindes postlarvale Sildeunger i større Mængde. I Slutningen af Maj og første Halvdel af Juni er der fundet ganske spæd Sildeyngel (mindre end 10 mm.) i Trangisvaag paa Suderø, og i August Maaned er der sammesteds fundet Sildeunger med en gennemsnitlig Totallængde paa ca. 27 mm. Et enkelt Eksemplar er endvidere fundet i Vaagfjord (Suderø). Der paakræves i høj Grad fortsatte Undersøgelser over Sildens Forekomst og Gydeforhold ved Færøerne.

Lodden (*Mallotus villosus*, O. Fr. Müller). Lodden forekommer i stor Mængde ved Island, men spiller ingen økonomisk Rolle af Betydning. Den har imidlertid den største Betydning som Fødeemne for Torsk og andre Fisk.

I det tidlige Foraar viser Lodden sig i store Mængder ved Syd- og Sydvestkysten af Island, hvad der staar i Forbindelse med Gydningen, idet denne om Foraaret udelukkende foregaar ved Island i det varmeste Vand (Temperatur i Overfladen omkring 6°) (Fig. 7). Efterhaanden som Vandet langs Vestkysten og Nordkysten hen paa Foraaret og Forsommeren bliver mere opvarmet, udstrækkes Loddens Gydeomraade til ogsaa at omfatte disse Strækninger (Fig. 8), og hen paa Sommeren har Vandet paa Østkysten faaet en saa høj Temperatur, at Lodden ogsaa gyder paa denne Strækning af Islands Kyster (Fig. 9 og 10). Paa Østkysten findes som bekendt de laveste Temperaturer Aaret rundt. Gydning finder tidligst Sted paa Østkysten i Juni eller muligvis først i Juli Maaned.

Gydningen paa Sydlandet foregaar i særlig Grad om Foraaret og aftager hen paa Sommeren. I August Maaned synes Gydningen her saavel som paa de øvrige Kyster af Island — Østlandet undtagen — at være ophørt (Fig. 10). Grunden til dette Forhold maa formentlig søges i de da herskende høje Temperaturer (Overfladetemperaturen 8—10°). I August Maaned er Overfladetemperaturen paa Østlandet derimod kun 6—8°, og da træffer man paa disse Strækninger endnu ganske spæde Unger af Lodde (mindre end 10 mm.).

Gydetiden strækker sig over følgende Maaneder paa Syd- og Øst-Island:

Syd-Island	April—Juli.
Øst-Island	Juli (Juni?)—August (September?)

Postlarvale Stadier af Lodde er truffet — omend i mindre Antal — i Farvandet mellem Færøerne og Island, men udelukkende store Eksemplarer, og naar der kun er truffet enkelte store Loddeunger i Nærheden af Færøerne, maa det formodes, at disse egentlig ikke er hjemmehørende ved Færøerne — Lodden forekommer kun meget sjældent ved Færøerne — men at det er Eksemplarer, der af Strømmen er ført ned fra Loddens Gydepladser ved Island.

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